

Lower Columbia Adult Passage Measures

Work Plan (FY99)

1. Purpose/Objective

This measure is intended to identify, develop solutions to, and implement appropriate improvements to adult passage facilities at the three lower Columbia projects. The objective is to assure that impacts and/or delays to adult passage through the adult fishways and ladders are minimized consistent with the objectives of the Fish Passage Plan. Adult passage issues and candidate improvement measures have and will probably continue to be identified through several avenues. This includes Corps in-house project operations and biological staff input, as well as that from tribal, state and Federal fish agencies. The current list of measures has been developed through coordination/negotiation with the Fish Program Operations & Maintenance regional group and the System Configuration Team. These measures are addressed in a letter report entitled Adult Fish Passage Improvements for Bonneville, The Dalles and John Day Dams, dated September 1997. It is noted that there is not unanimous concurrence in the region at this point that the current list of is complete. Issues remain in the region over the requirements for or details of adult passage improvements, which will continue to be worked.

2. Description of Activities

Coordination of measures and priorities. Ongoing coordination with region to resolve issues and come to regional consensus in establishing prioritized list of measures to evaluate/ implement. In FY 98, plan to finalize priorities based on the letter report above and regional input. Coordination will continue in FY 99

Evaluate debris build-up problem at B2 fish unit intakes. In FY 99 an A/E contract will be awarded to develop alternatives and recommendations. It is anticipated that a decision to pursue an implementation action will be made upon completion of the study at the end of FY 99.

Evaluate emergency backup AWS at B2. In FY 99 an A/E contract will be awarded to develop alternatives and recommendations. It is anticipated that a decision on an implementation action will be made upon completion of the study at the end of FY99. In FY 00, preparation of a FDM or letter report will be completed if warranted. Initiation of P&S may occur in late FY 00 depending on the scope of the recommended implementation action.

Automated trash raking system for John Day S. shore AWS. In FY 98, design will be completed and a contract will be prepared and awarded to procure the automated equipment. Installation will be completed during in-water work period in December 1998.

Automated trash raking system for B1 AWS Valve FV1-1. In FY 99, design will be completed and a contract will be prepared and awarded to procure the automated equipment. Installation will be completed during in-water work period in December 1998.

The following activities will also be pursued beginning in FY 99, unless other priorities develop. New measures resulting from regional coordination will be programmed when identified:

Initiation of a study of the fish holding and jumping issue in the John Day fish ladders. A scope of work for this study will be developed early in the FY. It is anticipated that an hydraulic model or models will need to be constructed and tested to in the attempt to get at the root causes of the problem.

Automated trash raking systems for B1 AWS Valve FV3-9, B2 AWS Valve FV5-9, and The Dalles AWS north shore intake. These are the other 3 locations for installation of automated trash raking based on the referenced report. P7S will be completed on these in FY99 and contract(s) to procure the equipment will be awarded. Completion of the installation will occur during the in-water work period in winter of FY 99/00.

Note: Initiation of an FDM for designs for dewatering The Dalles fishway is discussed in a separate workplan. Funding for that work (\$300,000) has been deducted from this workplan amount.

3. Schedule of Activities and Costs.

Schedule/ major milestones

Complete evaluations at B2	Sep 1999
Complete installation of 3 auto. trash raking systems	Dec 1999
Complete evaluations of John Day ladder jumping	TBD
Implementation of other measures (from evaluations)	TBD

Adult PIT Tag Development

Work Plan (FY99)

1. Purpose/Objective

Corps of Engineers participation in the research and development of adult PIT Tag detector technology.

2. Description of Activities

FY99 work requirements will consist primarily of coordination and review of the products being prepared by the NMFS, BPA and their contractors for installation of a test adult detector at Bonneville. Further coordination will be necessary to determine whether more involvement with installation of the test devices will require contract administration and inspection by the Corps. In outyears (after 00), beyond the R&D phase, it is anticipated that the Corps will assume a more active role in prototype and permanent installation of the technology at the projects.

3. Schedule of Activities and Costs

Schedule/major milestones.

Complete evaluation

To be determined

Cost estimate.

[illegible]

4. Other Information

4.1 Biological Opinion Measure. Incidental Take Statement, measure 14, in the 1995 Biological Opinion call for the BPA, NMFS and the Corps to “complete the design and development of adult PIT-tag detector systems in adult fish passage facilities at main stem dams...”

4.2 Points of Contact.

John Kranda, Project Manager
Blaine Ebberts, Technical Manager

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Bonneville Second Powerhouse Juvenile Bypass Improvements

Work Plan (FY 99)

1. Purpose/Objective

The purpose of this measure is to implement improvements to the existing juvenile bypass system at the Second Powerhouse at Bonneville Dam (B2). The work consists of hydraulic improvements within the collection channel inside the powerhouse, relocation of the outfall to a more biologically preferred site, and construction of a juvenile fish monitoring facility.

The need for this action is based on the following:

- Survival studies conducted in the late 1980's showed high mortality in the existing bypass system and downstream of the outfall release point in the tailrace. Bypass survival at B2 is currently estimated at 91% in the spring migration and 82% in the summer migration.

2. Description of Activities

Outfall Relocation. Based on extensive modeling at the Corps' Waterways Experiment Station, an outfall site approximately two miles downstream of powerhouse off the Washington shore was selected. A high and low tailwater release is required due to the significant fluctuations in the tailwater at Bonneville to meet NMFS impact velocity criteria. A load test performed on the outfall piers in FY 98 showed that containment rings are not required for lateral stability.

Downstream Migrant (DSM) Improvements. The improvements consist of a variety of measures planned to reduce delay and mortality in the system. The orifices from the gatewell into the collection channel will be enlarged. Additional orifices in a number of gatewells will be operated to provide relatively constant flow. Add in water will be provided to increase flow velocity in the upstream portion of the collection channel and new dewatering facilities will be constructed.

Juvenile Fish Monitoring Facility. Construction of the monitoring facility will provide both evaluation and PIT Tag monitoring capability. This will be constructed near the outfall location so that juveniles can be evaluated near the end of the transport flume.

Post-Construction Monitoring. Survival type studies, with large juvenile releases and evaluation of adult returns, is planned after construction to verify the actual benefits received. Because completion of the monitoring facility has been delayed to FY 00, we plan to provide temporary monitoring and evaluation capability in FY 99. The construction contract has been modified to ensure that permanent equipment outside the evaluation building need for PIT tag detection will be provided by March 99.

Measure /Activity	Estimated Costs				Schedule																													
	97/prior	98	99	00+	FY 97					FY 98						FY 99												FY 00			FY01			
					J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
B2 Bypass Improvements																																		
Main Contract		11500	17000	400																														
Outfall Contract		11500	2500																															
Casing Contract	400	300																																
Post Constr. Monitoring				3900																														
Temp PIT Tag/Eval ??			750																															
Support Activities	5128	3707	1650	500																														
Govt Furnished Eqpt		107	50																															
P & S/EDC		2100	605																															
S & A		1100	775																															
PM & Proj Support		150	170																															
Gatewell Debris P & S		200																																
Claim defense		50	50																															
FY Totals																																		
Measure Subtotal																																		
contingency																																		
Grand Total																																		

Note: Increased additional \$2 million due to deferral of monitoring facility

4. Other Information

- a. **Biological Opinion Measure** - The measures are included in the BIOP under RPA 15, RPA 22, RPA 23, and ITS 6.
- b. **ESA Effects** - Construction will occur during in-water work periods. Work near the adult system will occur during the in-water period or at night. Significant improvement in juvenile survival is expected.
- c. **Points of Contact**

Doug Clarke - Project Manager	503-808-4710
Naameh Nomie- Construction Representative	503-661-2420
Scott Chun- Engineering Technical Manager	503-808-4910
Rock Peters- Biological Studies Technical Manager	503-808-4777

Bonneville First Powerhouse Juvenile Bypass Improvements

Work Plan (FY 99)

1. Purpose/Objective

The purpose of this measure is to implement improvements to the existing juvenile bypass system at the First Powerhouse at Bonneville Dam (B1). The work consists of hydraulic improvements within the collection channel inside the powerhouse, relocation of the outfall to a more biologically preferred site, and construction of a juvenile fish monitoring facility.

The need for this action is based on the following:

- Survival studies conducted in the late 1980's showed high mortality in the existing bypass system and downstream of the outfall release point in the tailrace. Bypass survival at B1 is currently estimated at 85% in the spring migration and 70% in the summer migration.

2. Description of Activities

Outfall Relocation. Based on extensive modeling at the Corps' Waterways Experiment Station, an outfall site approximately two miles downstream of powerhouse off the Washington shore was selected. A high and low tailwater release is required due to the significant fluctuations in the tailwater at Bonneville to meet NMFS impact velocity criteria.

Downstream Migrant (DSM) Improvements. The improvements consist of a variety of measures planned to reduce delay and mortality in the system. Potential improvements consist of orifice modifications, provision of add-in water to increase velocities at the upstream portion of the collection channel, modifications to the collection channel (including potential modifications to the face of the powerhouse), and construction of new dewatering facilities outside the powerhouse. New methods to accommodate trash handling will be required due to impacts on the ice and trash sluiceway. A separate analysis of trash handling requirements will be prepared in 99.

Juvenile Fish Monitoring Facility. Construction of the monitoring facility will provide both evaluation and PIT Tag monitoring capability. This will be provided in the same building that will provide B2 monitoring capability. The facility was designed so that monitoring facilities for the first Powerhouse could be added with minimal disruption to the Second Powerhouse systems.

Post-Construction Monitoring. Survival type studies, with large juvenile releases and evaluation of adult returns, is planned after construction to verify the actual benefits received. Costs are covered in the B2 bypass improvements line item. We plan to evaluate the requirements for post-construction monitoring at B1 due to the delay in

implementation. This may require a separate evaluation. If a separate evaluation is required, the costs are not currently included in the program.

Support Activities. This includes model studies, FDM preparation, and plans and specifications for construction contracts. In addition, it also includes engineering during construction, construction management, project support, and project management.

3. Schedule of Activities and Costs

Schedule/major milestones.

Complete FDM for JBS & Outfall Relocation

October 98

Initiate P & S for Construction Contract

August 98

Advertise Contract

May 00

Award Contract

August 00

All systems operational

March 02

Cost estimate.

[illegible]

Note: Discussions are ongoing within the regional forum concerning the FY 99 allocation for this measure. Some members have requested \$5 million be assigned to this measure in 99. For the purposes of the workplan, it is assumed that expenditures in 99 will be \$3.5 million.

Construction cost estimates included in the FDM are being revised based on the deferral of the implementation decision to 00. The estimate is expected to increase due to inflation from the one-year deferral. We are in the process of finalizing the scope of work for P & S and EDC based on the final funding in FY 99. The cost estimates in the workplan have been updated to give a better estimate of projected costs. Previous cost estimates were based upon information from the SCS Phase 1 study. Revised cost estimates will be provided with the final 00 workplans.

The cost estimate at current price levels without inflation and contingencies is approximately \$59 million. The balance is due to inflation and contingencies.

4. Other Information

- a. **Biological Opinion Measure** - The measures are included in the BIOP under RPA 15, RPA 22, RPA 23, and ITS 6.
- b. **ESA Effects** - Construction will occur during in-water work periods. Significant improvement in juvenile survival is expected.
- c. **Points of Contact**

Doug Clarke - Project Manager	503-808-4710
Scott Chun- Monitoring Facility	
Engineering Technical Manager	503-808-4910
Ray Dewey- DSM/Transport Flume Technical Manager	503-808-4942
Rock Peters- Biological Studies Technical Manager	503-808-4777

October 1998

Bonneville Second Powerhouse Gatewell Debris Cleaning

Work Plan (FY 99)

1. Purpose/Objective

- Survival studies conducted in the late 1980's showed high mortality in the existing bypass system and downstream of the outfall release point in the tailrace. Bypass survival at B2 is currently estimated at 91% in the spring migration and 82% in the summer migration.

2. Description of Activities

A design letter report and plans and specifications have been previously funded under the B2 bypass improvements work item. Final cost estimates for this item will be completed in November 98 through these previously funded actions. The letter report will also evaluate whether or not it is appropriate to add this work item into the Columbia River Fish Mitigation Program. At this time, only the letter report and plans and specifications are included in the program.

This work, if funded, consists of prototype testing of improvements to aid cleaning debris from the gatewell at two units (11 and 12) at the Second Powerhouse. This will allow for testing and evaluation to determine if implementation throughout the entire powerhouse is warranted. Units 11 and 12 have historically incurred the heaviest debris loading.

3. Schedule of Activities and Costs

Schedule/major milestones.

Award contract for construction January 2000

Complete installation May 2001

Cost estimate.

Measure /Activity	Estimated Costs				Schedule																																														
	97/prior	98	99	00+	FY 97				FY 98								FY 99												FY 00					FY01																	
					J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D					
Gatwell Debris Cleaning																																																			
Gatwell Debris Cleaning	0	0	0	1500																																															
FY Totals	0	0	0	1500																																															
Measure Subtotal				1500																																															
contingency				0																																															
Grand Total				1500																																															

NOTE: Placeholder estimate. Letter report will provide cost estimate in Nov 98 and evaluate measure for inclusion in program.

4. Other Information

a. **Biological Opinion Measure** - This measure is not specifically included in the biological opinion. However, improvements to the downstream migrant system are specifically included.

b. **ESA Effects** - Increased survival within the bypass system is an expected benefit due to the following:

- Reduces average gate slot debris loads
- Reduces fish injury/mortality in the slot due to impacts with debris
- Reduces potential for fish orifice blockages
- Reduces debris load on collection channel dewatering screens

c. **Points of Contact**

Doug Clarke - Project Manager

503-808-4710

Ron Wridge - Technical Manager

503-808-4927

Bonneville Surface Bypass

Work Plan (FY99)

1. Purpose/Objective

This measure is an evaluation of surface bypass technology at the Bonneville project. The program includes prototype development at both powerhouses, as well as evaluating potential behavioral guidance devices as a means to improve spill efficiency. The purpose of the evaluation is to determine if full-scale implementation of surface bypass facilities is appropriate at Bonneville Dam as a means to improve juvenile collection and survival. Implementation of surface bypass technology will be evaluated against measures to improve FGE and survival of juveniles through the existing bypass system at the First Powerhouse and against gas abatement measures. At the Second Powerhouse, potential surface bypass systems would complement the existing bypass system or guide increased numbers of juvenile to the spillway without increased spill.

The need for this study is based on the following:

- Fish guidance efficiency (FGE) at the First Powerhouse is the lowest in the Columbia/Snake system. FGE at the Second Powerhouse is also below regional goals, despite several years of investigations to improve guidance.
- Spill limitations at Bonneville due to gas and adult fallback concerns limit the amount of spill at the project.
- Due to these limitations, the regional 80% fish passage efficiency (FPE) goal cannot be met.

2. Description of Activities

Activities/tasks.

First Powerhouse. Initial evaluation of a 4-unit prototype (units 3 - 6) was completed in 98. Results of this evaluation were very promising, but raised some concerns that resulted in a regional requirement to construct additional modules for a 00 test of units 1 – 6. Activities in 99 will include modeling, design, and initiating construction of modules for units 1 and 2. Design of follow-on phase 2 prototype testing has been deferred until after testing in 00.

A limited retest of the 98 prototype collector will be performed in 99. The test will focus on units 5 and 6, and will attempt to focus on evaluating fish behavior with two units operating side by side. The evaluation will also focus on further development of hydroacoustic evaluation to ensure we have a sound evaluation in 00. This test is dependent upon FFDRWG discussions to verify the scope and purpose of the evaluation.

We will continue evaluation of potential high flow outfall locations. Additional funding was added in 99 based on the regional forum. This Corps will present a proposed scope for coordination and agreement through FFDRWG. High flow dewatering options have been put on hold based on regional input.

FY 98 through 00 results will be used to make an early decision on implementation of ESBS or further testing and implementation of surface collection systems. The current surface bypass implementation decision is scheduled for 03 if early decisions are not made. In addition, advertisement for improvements to the bypass system at the first powerhouse (JBS modification, outfall relocation, and juvenile fish monitoring facility) is currently scheduled for summer of 00. Proceeding ahead with this schedule is dependent upon the status of our evaluation of surface collection and FGE improvements.

Second Powerhouse. Biological evaluation of the corner collector was performed in 98. The results of this evaluation showed that the trash chute is very effective at collecting juveniles. In 99, we will begin design of modifications to the entrance to increase the flow into the trash chute, modifications inside the chute to improve flow conditions, and begin siting the permanent outfall. This system would supplement the existing bypass system. In 99 we will also develop a schedule for implementation and coordination with the region. After identification of the outfall location and expected costs for the outfall, we will coordinate with the region to determine if we should proceed with implementation or test survival through the current system.

The development of a behavioral guidance device to increase the number of juveniles diverted to the spillway has been put on hold due to development of the trash chute as a corner collector. Minimal funding has been provided by SCT in 99 for a final trip to WES. The scope of this effort will be coordinated with FFDRWG. It could still potentially be considered in the future, as the first powerhouse system is developed to minimize the full-scale system.

Outfall and dewatering study. An alternatives analysis of potential high or medium flow outfalls, high flow dewatering, and combination systems was completed in FY98. As stated above, high flow dewatering has been put on hold due to lack of regional support. We will begin development of potential high flow outfall systems within the first and second powerhouse prototype systems as discussed above.

Baseline/General. FPE evaluations at Bonneville are currently scheduled for 00.

3. Schedule of Activities and Costs

Schedule/major milestones.

Begin units 1 – 6 B1 test	April 00
Decision to continue/defer additional B1 development	July 00
Permanent corner collector operational	TBD
Complete evaluation	September 03

Cost Estimate and schedule

Measure /Activity	Estimated Costs				Schedule																																															
	97/prior	98	99	00+	FY 97				FY 98				FY 99				FY 00				FY01																															
					J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D						
Bonn. Surface Bypass																																																				
Previous Work	11198																																																			
Engineering Studies		1505	3240	2400																																																
B1 Prototypes		542																																																		
B2 Corner Collector		139																																																		
B2 Guidance Device		237																																																		
Dewatering		364																																																		
98 report wrapup		223																																																		
high flow outfall																																																				
Prototype Construction		2200	1520	26000																																																
B1 prototype		2200		15000																																																
B2 chute/corner coll.				2000																																																
B2 guidance device				9000																																																
Biological Studies		2580	875	8000																																																
B1 PSC Hydroacoustics		1000																																																		
PSC radio telemetry																																																				
B2 Sluice Chute HA		190																																																		
Forebay Juvenile RT		1360																																																		
Biosonics Final Rpt		30																																																		
Project FPE HA																																																				
Data integration																																																				
PIT tag sampling																																																				
Highflow outfall & screens																																																				
Hydraulic Model Studies		255	765	1000																																																
B1 surface bypass																																																				
Dewatering concepts																																																				
High flow outfalls																																																				
B2 corner collector																																																				
Guidance device																																																				
New 1:40 proj. model				TBD																																																
Support Activities		550	250	2250																																																
FY Totals	11198	7090	6650	39650																																																
Measure Subtotal				64588																																																
contingency				0																																																
Grand Total				64588																																																
					Note: no contingencies have been included due to uncertainties with outyear estimates and prototypes. Outyear estimates haven't been updated due to 99 prioritization. See para. 4.d below.																																															

Note: no contingencies have been included due to uncertainties with outyear estimates and prototypes. Outyear estimates haven't been updated due to 99 prioritization. See para. 4.d below.

Summary of Costs by Major Feature:

98 Wrap-up, Critical Activities/High Flow Outfall-	\$1.5 Million
00 6-Unit B1 Prototype Test-	\$1.8 Million
Limited FY 99 B1 Retest-	\$1.5 Million (Subject to FFDRWG)
B2 Corner Collector Development-	\$1.7 Million
Finalize Guidance Curtain-	\$0.150 Million

4. Other Information

- a. **Biological Opinion Measure** - This measure is included in the BIOP as RPA 11. However, no specific date or requirement to evaluate surface bypass at Bonneville was included in the BIOP.

b. ESA Effects - None identified at this point. The goal is to improve project FPE. Research being coordinated through AFEP. All prototype installation will occur during designated in-water periods.

c. Points of Contact

Doug Clarke - Project Manager	503-808-4710
John Etzel- Surface Collection Technical Manager	503-808-4936
John Ferguson- Biological Studies Technical Manager	503-808-4775
Randy Lee- Hydraulic Studies Technical Manager	503-808-4876

d. Uncertainty of Outyear Cost Estimates - Fiscal Year (FY) 96 – 99
prioritization's have revised our schedules based upon limited funding. We plan to re-evaluate overall cost estimates and schedules during FY 99. Revised cost estimates for 99 activities were prepared with limited information and time due to the prioritization process. Outyear cost estimates have not been updated to reflect these changes.

Bonneville First Powerhouse Fge Improvements

Work Plan (FY99)

1. Purpose/Objective

This measure is an evaluation of potential measures to improve fish guidance efficiency (FGE) at the First Powerhouse. The objective of the study is determine if FGE improvements should be permanently installed at the First Powerhouse. The measures will be evaluated against surface bypass systems and gas abatement measures in the implementation document.

The need for this study is based on the following:

- Fish guidance efficiency (FGE) at the First Powerhouse is the lowest in the Columbia/Snake system.
- Spill limitations at Bonneville due to gas and adult fallback concerns limit the amount of spill at the project.
- Due to these limitations, the regional 80% fish passage efficiency (FPE) goal for Bonneville Project cannot be met.

2. Description of Activities

Testing of new extended length ESBS's, VBS, and streamlined trashracks was performed in 98. In 99, we will finalize reports from 98 testing and perform a structural evaluation of the ESBS. All other activities will be deferred until 00. We will also revise the cost estimates for the entire program in 99, based upon the deferral of activities by the regional prioritization. The cost estimates provided within haven't been updated to reflect the changes.

In 00, we will evaluate the ESBS for comparison against the prototype surface collector. Potential implementation decisions could be made based on this test. We will also evaluate fish behavior in front of the trashracks to determine if trashrack relocation tests should be performed in 01.

3. Schedule of Activities and Costs

Schedule/major milestones.

Begin second year of ESBS biological evaluations	April 00
Draft final report	April 01 ¹
Completion of Evaluation	September 01 ¹

¹Assumes no additional testing of ESBS nor further trashrack relocation tests are necessary.

Cost estimate.

[illegible]

4. Other Information

- a. **Biological Opinion Measure** - The BIOP included provisions for evaluation of measures to improve FGE at RPA 12. No specific date was provided in the BIOP for prototype evaluations or implementation of measures.
- b. **ESA Effects** - A research plan is being developed through the AFEP process. All installation of prototype equipment will be completed in accordance with appropriate in-water work dates.
- c. **Points of Contact**

Doug Clarke - Project Manager	503-808-4710
Randy Lee- Technical Manager	503-808-4876
John Ferguson- Biological Studies Technical Manager	503-808-4775

Adult Fallback Alternatives Analysis

Work Plan (FY99)

1. Purpose/Objective

The purpose of the measure is to evaluate alternatives to reduce adult fallback over the spillway at Bonneville Dam for fish that exit from the North fishway at Bradford Island. This was added to the list for consideration in FY 98, based on SCT Bonneville subgroup discussions on development of the five-year plan for Bonneville. Subsequent prioritization discussions deferred this work to FY 99.

- Concerns about adult fallback over the spillway limit the amount of spill at Bonneville. This limitation, coupled with the limited guidance efficiencies at both powerhouse bypass systems and spill limitations to limit dissolved gas generation, results in an inability to meet the 80% FPE goal at the project.
- Adult radio telemetry work conducted in recent years shows there is a problem (approximately 15% fallback), but it is not as significant as expected even with high spill in the last two years.

2. Description of Activities

The major tasks for this measure include reviewing past information on the issue and evaluating flow conditions in the hydraulic models to compare with actual fish behavior. Based on the results of this information, an analysis of potential alternatives to solve the problem may be performed. Potential alternatives include relocation of the Bradford Island fish ladder exit and installation of some type of barrier of the tip of Bradford Island. Scoping the evaluation will also be performed in FY 98 to prepare for initiation of studies in FY 99.

3. Schedule of Activities and Costs

Schedule/major milestones.

Initiate scoping

October 1997

Complete evaluation

To be determined

Cost estimate.

[illegible]

1/ All estimates are placeholder numbers. Actual estimates will be developed after scoping.

4. Other Information

a. Biological Opinion Measure - N/A

b. ESA Effects - None identified at this time.

c. Points of Contact

Doug Clarke - Project Manager

503-808-4710

John Ferguson - Technical Manager

503-808-4775

October 1998
November 1998
To be determined

Bonneville Flat Plate PIT Tag Development

Work Plan (FY99)

1. Purpose/Objective

Testing and development of flat plate PIT Tag detector technology at the First Powerhouse and use of the system as interim monitoring.

2. Description of Activities

Actual FY 99 work requirements have not been identified. Placeholder dollars included for project support to assist NMFS with modifications to the facilities as required to provide ongoing data collection.

3. Schedule of Activities and Costs

Schedule/major milestones.

Complete evaluation

To be determined

Cost estimate.

[illegible]

4. Other Information

b. Biological Opinion Measure - N/A

c. ESA Effects - N/A

d. Points of Contact

Doug Clarke - Project Manager

503-808-4710

Tim Berge- Technical Manager

503-808-4926

Blaine Ebberts- Biological Point of Contact

503-808-4763

Dissolved Gas Abatement Study Phase II

Preliminary FY00 Work Plan

1. Purpose and Objective. The Corps Dissolved Gas Abatement Study (DGAS) began in 1994 with the objective of determining what measures could be taken to meet the TDG water quality criteria. The Dissolved Gas Abatement Study Phase I defined and recommended further evaluation of methods to reduce dissolved gasses created during spillway operations at the Lower Columbia and Snake River dams. Phase I was at a reconnaissance level of detail. Several alternatives were identified in Phase I which may reduce gas and provide significant biological benefits while not meeting the water quality standard, therefore the study goal or purpose was revised. The purpose of Phase II of the DGAS is to recommend structural and operational measures which can be implemented to reduce TDG supersaturation in the Lower Snake and Columbia Rivers to the extent technically, economically, and biologically feasible in response to the NMFS Biological Opinion on endangered salmon.

Phase II will proceed with a detailed evaluation of gas abatement alternatives at Bonneville, The Dalles, John Day, McNary, Ice Harbor, Lower Monumental, Little Goose, and Lower Granite. This study will be at a feasibility level. Recommendations will be made based on a system-wide biological and water quality improvement analysis.

2. Tasks. FY00 will likely be the last year of the Phase II DGAS study. Remaining tasks include the continuation of the system-wide analysis, which will be initiated in FY99 upon completion of the numerical model. Also, the final report with recommendations will be drafted, reviewed and completed by the end of FY 00.

3. Preliminary Cost Estimate. The estimated FY00 cost for the above tasks is \$800,000.

Gas Abatement Fastrack (Spill Optimization)

Work Plan (FY99)

1. Purpose and Objective

A recent National Marine Fisheries Service's (NMFS) proposal calls for investigating the potential installation of additional spillway deflectors and/or providing modifications to existing deflectors on the spillways of the lower Snake and Columbia River dams. The purpose of the additional deflectors and/or modifications is to allow higher spill levels for passing juvenile salmonids while staying below the 120% total dissolved gas (TDG) supersaturation level as recorded by the tailrace fixed monitoring stations. Additionally, Paragraphs 1i, 1k and 3c of the May 14, 1998, *Supplemental Biological Opinion on the Operation of the Federal Columbia River Power System* call for several spill-related measures at the projects. Para. 1i calls for spill survival studies at each project. A spill survival study is underway at The Dalles and an additional year of tests are proposed for FY 99 (see separate workplan). Para. 1k calls for spill effectiveness studies. This is also underway at The Dalles and will also be conducted at John Day (24-hour spill test under separate workplan). Para. 3c calls for physical hydraulic model studies of the tailrace hydraulic conditions at McNary and all four lower Snake River dams. These model studies will allow development of spill patterns to achieve acceptable tailrace hydraulic conditions both with and without the additional spillway deflectors. Studies of physical injury associated with various spill levels and improvement measures at each project will also be conducted as part of the analysis. The spill optimization program will bring these spill-related activities under one umbrella for the purposes of prioritization of projects and measures to achieve fast track improvements and meet the BIOP requirements in a consistent and coordinated manner.

2. Tasks

Six separate Engineering Design Documents (EDD's) will be prepared, one for each of the Lower Snake and Columbia River dams with the exception of Ice Harbor and John Day. (End bay deflectors for Ice Harbor are currently under contract for construction in the fall of 1998. John Day end bays 1-20 are covered in a separate workplan.). The following tasks are anticipated for this effort.

Construct and Test Physical Hydraulic Models. Evaluation of additional or modified deflectors and associated tailrace conditions will require testing in sectional and general hydraulic models of each project. Hydraulic models of Little Goose, Lower Monumental and McNary will need to be constructed, calibrated and tested. In addition, a new larger scale 3-bay sectional model of the Lower Granite spillway may also be necessary. Hydraulic models for other projects exist and are assumed to be at the correct scale for this analysis.

Forebay and tailrace bathymetric data will need to be gathered for construction of the identified models with the exception of McNary where bathymetric data currently exists in sufficient detail. Tailrace bathymetry will also be needed for the existing 1:80 scale Lower Granite and Bonneville general models. The general model of Ice Harbor will need some minor work to restore the bathymetry downstream of the spillway stilling basin.

In addition, it may be necessary to obtain some velocity and river stage data for use in calibration of the new general models.

Model Testing. During construction of the physical hydraulic models indicated above, model test plans can be developed for evaluating deflectors and tailrace conditions. Initial work will consist of model calibrations and data documentation of existing base conditions. New structural features will then be installed in the models and testing will commence. Several coordination trips by engineering personnel are anticipated during the testing. In addition, fishery agency biologists will be invited to attend one or two of the coordination trips to view the models and obtain their input.

Conduct Field Testing. It may be necessary to conduct near field gas testing at some of the projects for which this data is not available. This information will provide some basis to assess existing structure performance and assist in providing information for making estimates of TDG improvements with new or modified deflectors in place.

Physical Injury Studies. An initial focus of fast-track physical injury will be assessment of spill pattern/discharge/survival relationships for deflectors already installed through the FHS. The idea being to obtain sufficient information to define the range of “safe” spill operations for these existing structures.

The primary objectives of the physical injury studies are to: 1) provide information about linkage between the structural and operation features of fast-track alternatives and the potential for physical injury in the design of fast-track alternatives, and 2) develop biological based criteria for the operation of implemented fast-track alternatives that optimizes fish passage survival within constraints of spill effectiveness, TDG production, and spill pattern (i.e. spill operational parameters).

It is unclear at this time how much information to satisfy biological fast-track analysis needs can be obtained from previous spill survival, spill effectiveness/efficiency, and related studies. However, it is certain that previous spill work was too limited in experimental design to provide much information about migrant survival as a function of total spill discharge over the complete operating range. The question about the utility of previous studies to answer fast-track physical injury uncertainties will be answered during the first year of fast-track (FY99).

Spill Survival and Effectiveness Studies. A comprehensive plan and schedule for accomplishment of these studies at all projects is under development for the out years. The most effective techniques to obtain consistent, reliable data for all projects will be developed. In the meantime, for FY99, placeholder funds in the amount of \$500,000 for spill effectiveness studies for Lower Monumental and Ice Harbor have been added to the

program. The scope and methodology for these studies will be finalized and the cost estimate is likely to be higher.

Prepare Engineering Design Documents. The following information will be presented or discussed in each report: 1) Description of existing spillway structures and their TDG performance; 2) Discussions of the potential for improving existing deflector performance through structural modifications and/or additional deflectors; 3) model study results (sectional and general); 4) assessments of tailrace hydraulic conditions as a result of operational spill patterns both with and without deflector modifications; 5) evaluation of needs for other features to improve tailrace conditions for juvenile and adult fish passage, navigational impacts, spillway stilling basin erosion impacts, etc.; 6) NEPA considerations; 7) construction methods; 9) estimated design, construction costs and schedule, and; 5) recommendations.

3. Schedule and Costs

Measure /Activity	Estimated Costs					Schedule									
	99	00	01	02	03	FY 99		FY 00		FY 01		FY 02		FY 03	
McNary fast track/spill patterns															
Model construction	940	940													
Model tests		184	184												
Survival/ effectiveness		TBD	TBD												
Physical injury		TBD	TBD												
EDD			323												
Coordination	20	48	48												
subtotal	960	1172	555												
Bonneville fast track															
Bathemetry	25														
Model construction	260														
Model tests	220														
Field tests	125														
Survival/ effectiveness		TBD	TBD												
Physical injury		TBD	TBD												
EDD	190	133													
Coordination	50	51													
subtotal	870	184													
L. Monumental fast track/spill patterns															
Bathemetry	25														
Model construction	615	615													
Model tests		235													
Survival/ effectiveness	250	TBD													
Physical injury		TBD													
EDD		95	228												
Coordination	30	39	40												
subtotal	920	984	268												
L. Goose fast track/spill patterns															
Bathemetry		25													
Model construction			715	715											
Model tests				205	30										
Survival/ effectiveness			TBD												
Physical injury			TBD												
EDD					323										
Coordination		10	25	35	35										
subtotal		35	740	955	388										
Ice Harbor spill patterns															
Model construction	5														
Model tests	55														
Survival/ effectiveness	250	TBD													
Physical injury		TBD													
Report/coordination	60														
subtotal	370														
L. Granite fast track/spill patterns															
				882	219										
The Dalles deflectors			34	446	179										
Physical injury evaluations															
Develop methodology	380														
FY Totals	3500	2375	1597	2283	786										
	Measure subtotal				10541										
	Contingency				20000	(physical injury, survival and effectiveness studies)									
	Total				30541										

Milestones

Jun 00	Complete Bonneville EDD
Sep 01	Complete McNary EDD
Sep 02	Complete Lower Monumental EDD
Sep 03	Complete Lower Granite and The Dalles EDDs

4. Other Information

4.1 Biological Opinion Measure. Reasonable and Prudent Measure 18 in the Biological Opinion on endangered Snake River salmon stocks and other declining Pacific salmon stocks requires the Corps to “develop and implement a gas abatement program at all projects with appropriate structural modifications.”

4.2 ESA Effects. The research plan was developed and is coordinated through the AFEP process.

4.3 Points of Contact.

John Kranda, Project Manager	(503) 808-4709
Kim Fodrea, Engineering Technical Manager	(503) 808-4880
Rock Peters, Biological Studies Technical Manager	(503) 808-4777
Rick Emmert, Walla Walla District Technical Manager	(509) 527-7536

[illegible]

4. Other Information

a. Biological Opinion measure VIII.A.22: To be completed as soon as possible, but not later than 1997 at John Day.

b. ESA Effects: All in-water work will be completed prior to facility start-up each April.

c. Points of Contact

Stuart Stanger -Project Manager	(503) 808-4706
Joe El-Khal - Technical Manager	(503) 808-4940
John Ferguson - Biological Testing	(503) 808-4775
Naameh Nomie - Construction Rep.	(503) 661-2420

John Day Extended Length Screens Work Plan

1. Purpose/Objective

The existing 20-foot submerged traveling screens at John Day Dam will be replaced by 40-foot extended length submerged bar screens. The longer screen length will intercept a greater percentage of fish, increasing fish guidance efficiency to meet regional requirements set forth by NMFS. Three ESBS's will be installed in each of the 16 power generating turbine intakes. The addition of ESBS will allow higher flows through the turbines in the summer months, thus reducing the drop in power production.

Vertical barrier screens (VBS) are located in the bulkhead slot of each turbine unit, and keep fish from re-entering the turbine intakes. The proposed ESBS's will guide a greater volume of water into the bulkhead slots, requiring modification of the existing VBS.

The gate repair pit and the gate storage pit are currently used for maintenance of submerged traveling screens, bulkheads, etc. Because of the additional future requirement for maintenance the configuration of the gate repair pit and the gate storage pit will be modified.

A high capacity tugger hoist will be installed to improve screen handling efficiency and safety.

Because of the potential for a significant increase in use of the orifice valves with the installation of ESBS the orifice valves will be modified.

2. Description of Activities

- * Continue development of ESBS to include model testing and biological testing.
- * Install extended length screens in 16 units.
- * Modify the maintenance pit to accommodate the extended length screens.
- * Modify the orifice valves.
- * Install high capacity tugger hoist.
- * Provide engineering during construction, supervision and administration, project support and project management.
- * Determine OPE using PIT tagged fish (MPE-P-96-3).
- * Begin studies to determine the effect of extended length screens on lamprey (MPE-P-96-3).
- * Post Construction Evaluation

3. Schedule of Activities and Costs

Measure /Activity				Schedule																											
	99	2000	01+	FY 99												FY 00												FY			
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Screen Plans and Specification	0	150	0																												
Screen Construction Contract	0	0	24100																												
Prototype Modification Contract	440	0	0																												
Orifice Valve P&S	43	0	0																												
Orifice Valve Contract	300	0	0																												
FDM Supplement	0	100	150																												
Maintenance Pit Construction Contract	0	800	0																												
Tugger Hoist Contract	0	300	0																												
P&S for Deck Slots & Lifting Beam	0	100	300																												
Hydroacoustic Evaluation	200	20	270																												
Lamprey Studies	350	385	50																												
Direct Capture/OPE	500	50	585																												
Design/Development, EDC, S&A, project support and management	767	840	4200																												
FY Totals	2600	2745	29655																												
Contingency			6000																												
Grand Total			41000																												

4. Other Information

a. Biological Opinion measure

VIII.A.21; "The COE, pending evaluation that includes an analysis and determination of descaling incidence and the results of screen prototype tests, and surface collection, shall install extended length screens at John Day by April 1998."

b. ESA Effects

All work will be fully coordinated with NMFS to reduce impacts to endangered or threatened species. In past years our ability to conduct testing has been impacted by the ESA.

c. Points of Contact

Stuart Stanger -Project Manager
 Elvin Antonio - Technical Manager
 John Ferguson - Biologist

(503) 808-4706
 (503) 808-4926
 (503) 808-4775

Measure /Activity	Estimated Costs (\$000)			Schedule																												
	99	2000	01+	FY99												FY00												FY01				
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
Feature Design Memorandum (Two-unit)	0	0		Completed in FY 98																												
Two-unit Prototype Plans and Specifications	0	0		All Work Deferred Pending Drawdown Decision																												
Four-unit Study	180	300																														
EDC, S&A, project support and management	20	50		All Work Deferred Pending Drawdown Decision																												
FY Totals	200	350	84000																													
Contingency																																
Grand Total																																

4. Other Information

a. Biological Opinion measure

VIII.A.11; If testing at Ice Harbor in Spring of 1995 and The Dalles in 1996 indicates that surface collection is effective at conventional powerhouses, the COE will expedite scheduling to begin testing at John Day in 1997 or as soon as possible.

b. ESA Effects

All in-water work and biological testing will be fully coordinated with NMFS to avoid impacts to endangered or threatened species. Construction schedules will likely be significantly longer when taking into account in-water work periods.

c. Points of Contact

Stuart Stanger -Project Manager	(503) 808-4706
Matt Hanson - Technical Manager	(503) 808-4934
John Ferguson - Biologist	(503) 808-4775

John Day Spillway Surface Bypass Work Plan

1. Purpose/Objective

An effective spillway surface bypass system would reduce juvenile fish delays at the dam, increase the number of fish safely bypassed around the powerhouse, and thereby improve fish passage efficiency (FPE) at the project.

2. Description of Activities

In FY 98 all activities were deferred by SCT. For FY 99, however, the SCT agreed to have the Corps look at modifying an existing spillway bay into a surface bypass spillway. It is thought by some that this may be a lower cost than modifying the skeleton bays and perhaps SCT could then agree to fund this surface bypass method. Technical staff in Portland District do not believe the cost difference in cost between modifying a skeleton bay or modifying a spill bay will be significant. Further, CENWD has recommended (memorandum dated 16 Oct 98) that the capacity of the spillway not be reduced below the original design level. Portland District will meet with FFDRWG to get a better understanding of what SCT is requesting. Until the scope of effort is agreed upon only minimal effort will be expended. Due to the limited funds in FY 99 and uncertainty about the scope it has been assumed that this study will continue into FY 00.

- * Test the overflow weir prototype under low flow conditions (Not funded for FY 99) using hydroacoustics and radio telemetry (FY00 if funded and a low flow year).
- * Investigate and prepare a report which discusses the feasibility of converting an existing spillway bay into a surface bypass spillway. This document could be used to determine whether or not a Feature Design Memorandum (FDM) effort is warranted.
- * Outyear activities are dependent on the outcome of the weir test and the report on the modified spillbay.

3. Schedule of Activities and Costs: Estimates provided are “placeholder” estimates. Scopes of work and more accurate estimates will be prepared as we identify the work required.

Measure /Activity	Estimated Costs (\$000)			Schedule																										
	99	2000	01+	FY 99												FY00												FY01		
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Weir Prototype Testing	0	500																												
Modified Spillway Report	120	100																												
Modified Spillway FDM		500																												
P&S for ???			1000																											
Modified Spillway Prototype			60000																											
Design, supervision and administration, project support and management	20	100																												
FY Totals	140	1200	61000																											
Contingency			30000																											
Grand Total			92340																											

4. Other Information

a. Biological Opinion measure

VIII.A.11; If testing at Ice Harbor in Spring of 1995 and The Dalles in 1996 indicates that surface collection is effective at conventional powerhouses, the COE will expedite scheduling to begin testing at John Day in 1997 or as soon as possible.

b. ESA Effects

All in-water work and biological testing will be fully coordinated with NMFS to avoid impacts to endangered or threatened species.

c. Points of Contact

Stuart Stanger -Project Manager	(503) 808-4706
Matt Hanson - Technical Manager	(503) 808-4934
John Ferguson - Biologist	(503) 808-4775

John Day Drawdown Work Plan

1. Purpose/Objective

National Marine Fisheries Service has provided a professional scientific determination that this measure is an important component in the overall effort to improve survival of the listed species.

2. Description of Activities

- * Conduct a two-phased study that would consider lowering the John Day pool to near spillway crest or natural-river; the Corps currently has authority to work on phase I only.
- * Phase I will use existing information to evaluate biological, social and economic benefits and costs of the two alternatives, spillway crest and natural river, and will identify the potential physical impacts of drawdown.

3. Schedule of Activities and Costs

The Corps has stated that the Phase I study, as scoped, could be completed in about one-year (12 to 18 months) and at a cost of about \$3.3 million. A detailed schedule is being developed by the team and will be coordinated with the SCT.

Given that Congress will not have the phase I study until fiscal year 2000 and phase II will not be scoped until requested by Congress it is unlikely that the Phase II study will begin in FY 00. It is possible that scoping of the phase II effort could begin in FY 00 and therefore a “place-holder” estimate of \$300,000 should be included in the FY 00 program.

4. Other Information

- a. Biological Opinion measure
VIII.A.5; “Investigate feasibility to operate John Day pool to Spillway Crest”.
- b. ESA Effects
ESA effects will be considered during the second phase of study.
- c. Points of Contact
 - Stuart Stanger -Project Manager (503) 808-4706
 - Chris Ferguson - Project/Tech Manager (503) 808-4910
 - John Ferguson - Biological Testing (503) 808-4775

John Day; 24-Hour Spill Work Plan

1. Purpose/Objective

To determine project fish passage efficiency and spillway effectiveness.

Studies will be done to determine the optimum spillway operation to accommodate survival goals.

2. Description of Activities

- * Develop detailed scopes of work and cost estimates.
- * Conduct 24 hour spill evaluations using hydroacoustics and radio telemetry (MPE-P-97-5) (MPE-P-98-4).
- * Determine FGE using hydroacoustics and fyke net (MPE-P-96-3).
- * Determine FPE using radio telemetry and hydroacoustics.
- * Conduct model tests to support evaluation of 24 hour spill and extended length screens.

3. Schedule of Activities and Costs

Measure /Activity	Estimated Costs (\$000)			Schedule																										
	99	2000	01+	FY 99												FY 00												FY01		
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Radio Telemetry	1150	1192	70																											
Hydroacoustics	600	660	60																											
Model Studies	40	44	40																											
Design, EDC, S&A, project support, management	110	124	40																											
FY Totals	1900	2020	210																											
Contingency			500																											
Grand Total			4630																											

4. Other Information

a. Biological Opinion measure

VIII.A.2: The COE shall spill at all non-collector projects to achieve a fish passage efficiency target of 80%.

VIII.A15: The COE shall proceed with studies that will result in improvements in fish passage at main stem dams to support salmon smolt-to-adult survival ratios that foster long-term population growth. The interim performance objectives for these bypass improvements is an 80% fish passage efficiency and a 95% passage survival at each dam.

b. ESA Effects

No effects on the work plan are anticipated from the Endangered Species Act. All work will be fully coordinated with NMFS to avoid impacts to endangered or threatened species.

c. Points of Contact

Stuart Stanger -Project Manager	(503) 808-4706
John Ferguson - Biological Testing	(503) 808-4775

John Day Flow Deflectors: Bays 1 and 20 Work Plan

1. Purpose/Objective

Reduce levels of Total Dissolved Gas (TDG) that occur during spill operations at the John Day project. The gas abatement program phase 1 technical report, dated April 1, 1996, recommended that flow deflectors be installed on the John Day spillway. Deflectors have been installed in bays 2 through 19. Deflectors were not installed in bays 1 and 20, however, due to concerns about the potential impacts on adult entrances.

2. Description of Activities

- * Initiate and complete engineering, modeling and biological analysis to determine whether flow deflectors should be installed in bays 1 and 20.
- * Prepare a supplement to the Flow Deflector Feature Design Memorandum which presents rationale and costs regarding the following:
 - * The incremental DGAS benefit to installation
 - * The deflector elevation
 - * The effects on the adult fish entrances
 - * The effect of the existing deflectors on the navigation lock entrance
 - * The effect of deflectors in bays 1 and 20 on the navigation lock entrance
 - * Alternatives for consideration if navigation is significantly impacted by flow deflectors and the subsequent flow patterns.
- * Prepare Plans and Specifications for installation of deflectors in bays 1 and 20; assumes a decision to proceed with installation. Should the decision be made not to install deflectors in bays 1 and 20 then obviously the Plans and Specifications would not be required.
- * Prepare Plans and Specifications for installation of measures to alleviate Navigation problems caused by the installation of flow deflectors and the subsequent change in spill patterns; assumes a problem does exist or will be created with the addition of deflectors in bays 1 and 20.
- * Install flow deflectors in bays 1 and 20; dependant on decision made in FY 99.
- * Provide engineering during construction, supervision and administration, project support and management.

3. **Schedule of Activities and Costs:** All estimates beyond FY 99 are provided as “placeholder” estimates only. Scopes of work will be prepared when the requirements are better defined.

[illegible]

4. Other Information

a. Biological Opinion measure

VII.A.18; “The COE shall develop and implement a gas abatement program at all projects with appropriate structural modifications. The program shall include stilling basin and spillway modifications to reduce gas supersaturation at Ice Harbor and John Day Dams as soon as possible,…”

b. ESA Effects

All in-water work will be completed between September 1 and April 1 to avoid impacts on migrating fish. Further, all work will be fully coordinated with NMFS to avoid impacts to endangered or threatened species.

c. Points of Contact

Stuart Stanger - Project Manager

(503) 808-4706

Matt Hanson - Technical Manager

(503) 808-4934

John Ferguson - Biologist

(503) 808-4775

4. Other Information

- a. Biological Opinion: *Feasibility Studies for Long-Term Alternative System Configurations in the Lower Columbia River.*

Complete the status report by mid-2000. The final feasibility study would include the appropriate NEPA and ESA documentation and, if necessary, recommendations to Congress for authorization and implementation of a selected plan for the lower Columbia River reach by 2004.

- b. ESA Effects

Necessary NEPA and ESA documentation will be prepared along with the Feasibility report.

- c. Points of Contact: To be determined.

John Day Mitigation Relocation Evaluation Ringold Hatchery Test Facility

Work Plan (FY 99)

1. **Purpose/Objective:** In response to the National Marine Fisheries Service Hatchery Biological Opinion and Proposed Recovery Plan for Snake River Salmon, the COE is proceeding with two actions to evaluate movement of John Day Lock and Dam project mitigation production from sites on Bonneville Pool to the Ringold Springs Fish Hatchery, WA.

2. Description of Activities:

a. Test Facility Construction: The test facility is being constructed by WDFW with prior year funds that are obligated under the terms and conditions of a Cooperative Agreement. The facility includes construction of a spring intake, water line, two raceways, and an adult capture facility. The intake and pipeline are complete. The raceways contract is scheduled for completion in April of 1998. The adult capture facility will be accomplished by amendment to the raceway contract.

b. Biological Research: The research proposed by WDFW includes a five year program (1997-2001) of fish marking, transportation, tag recovery, and analysis. It may be extended if necessary to determine the site's suitability to accommodate production. The research will compare survival and contribution to the adult stage using coded wire tags applied to a control group and several treatment groups.

c. Letter Report: A Letter Report will evaluate the Ringold Fish Hatchery's suitability to meet John Day productions goals on a permanent basis. Generally, the study will re-establish production goals based on current conditions, evaluate releases at Ringold springs since 1994, analyze a range of hatchery configurations which meet production goals, recommend a configuration, present designs and cost estimates for the recommended configuration, and present the results for an implementation decision and funding. The letter report was initially planned for FY 98. Current scoping indicates that the study will be delayed until after analysis of return data from controlled releases to the test facility. The first return from a controlled release will be 2001. This will allow consideration of test returns in the analysis.

3. Schedule of Activities and Costs:

					J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
Construct Test Facility	2112.8	0	0	0																													
Marking, Transport, Tag Recovery	193	163.3	200	288.2																													
Letter Report	0	215	1/																														
1/ This estimate is a placeholder for FY98; a study cost estimate and schedule for the Letter Report are under development.																																	
FY Totals	2306	379	200	288.2																													
Measure Subtotal contingency				0%																													
Grand Total	3,108.2																																

4. Other Information:

a. Background: The construction of John Day Lock and Dam inundated habitat of fall chinook salmon. Mitigation was established at 30,000 spawners annually. Mitigation for these losses were originally through artificial (hatchery) production. Early in the development of mitigation planning, an upriver hatchery site was sought for mitigation of impacts on wild fall chinook spawning production. However, a viable site was not found. Mitigation was eventually provided by expanding production at Bonneville Hatchery and Spring Creek Hatchery on Bonneville pool. The initial hatchery production of an early spawning “tule” fish stock has gradually been replaced by a later spawning “upriver bright” fish stock, which closer duplicates the lost native stocks. Description of the mitigation program in the authorizing documents indicated the program may be modified after further evaluation or availability of new knowledge.

Evaluation and testing of the mitigation program have continued since initial mitigation was provided, but the hatchery mitigation program has not been modified to the satisfaction of the Tribal Governments, who are considered co-managers as a result of U.S. v Oregon. The current practice of providing mitigation from production below Bonneville Dam for lost spawning in the John Day pool is not acceptable to the Tribes, since this program does not provide an opportunity for the Tribes to exercise their treaty fishing rights to harvest fish within zone 6 (including Bonneville, The Dalles and John Day pools) of the commercial treaty fishing area.

There is a consensus among the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), Northwest Power Planning Council (NPPC), state resource agencies and Tribal Governments that the Ringold Springs Hatchery site has the potential to provide in-kind, in-place mitigation for lost spawning of fall chinook salmon in the John Day pool. This was supported by a joint BPA-USFWS-Sverdrup study in 1987 investigating eight potential rearing and acclimation sites for fall chinook salmon.

The Ringold Springs site was selected as the first option, based upon water quality and quantity.

Ringold Springs Hatchery was constructed 18 miles north of Richland, Washington by the U.S. Bureau of Reclamation (USBR) and is currently operated by Washington Department of Fish and Wildlife (WDFW). Existing facilities include: a spring collector and distribution system, vinyl raceways, rearing and capturing/holding ponds and several support structures for the collection, raising and release of fall chinook salmon, as well as steelhead and warm-water fish.

At the request of the Columbia River treaty tribes, federal and state fishery agencies released 4.8 million smolts in 1994, which were produced at Bonneville. These fish were acclimated and released at or near the Ringold Springs Hatchery facilities and began returning as adults in the summer of 1996 to the release sites near Ringold, Washington. Approximately 3.5 million smolts were released in 1995 and 1996. At the time of these releases, Ringold Springs Hatchery lacked the facilities to accommodate this production. As stated in a NMFS letter, dated 2 May 1994, there was an immediate need for additional facilities at Ringold Springs to receive the returning adult fish and continue to acclimate the juvenile fish. If the returning fish were not properly received at or near the Ringold Springs Hatchery, they would most likely stray and have the potential to negatively impact the ESA-listed Snake River fall chinook salmon.

b. Points of Contact:

George Miller - Project Manager	(503) 808-4704
Blaine Ebberts - Letter Report & Biol. Testing Tech. Mgt.	(503) 808-4763

**The Dalles Surface Bypass Study
Work Plan
(FY99 Emphasis)**

1. Purpose/Objective:

The purpose of this measure is to investigate and evaluate surface bypass technology at The Dalles project. The program includes collection of biological behavior field data, hydraulic model testing of various surface bypass alternatives at the powerhouse and spillway and development and testing of prototype surface collectors.

The policy to utilize the spillway at The Dalles as the current primary method to bypass juvenile fish during the juvenile fish outmigration period has resulted in reduced emphasis and deferral of surface bypass studies at The Dalles. As a result, funding for surface bypass studies was significantly reduced in FY96 and FY97, and was eliminated in FY98. It is assumed that funding for development of a Surface Collector prototype design for The Dalles powerhouse for FY99 and beyond would remain a relatively low priority. Results of the FY98 Spillway and Sluiceway Survival studies, however, indicated a relatively large increase in percentage of juveniles that utilize the Ice and Trash Sluiceway, (as opposed to turbines) to pass the powerhouse during reduced spill volumes. Further analysis of the influence of partially blocked trashracks on sluiceway guidance is planned with hydraulic model studies in FY99 and advanced prototype field tests, beginning in FY 2000. Vertical distribution of juveniles approaching the powerhouse is also planned in FY99 to measure juvenile turbine entrainment. Hydroacoustic and radio telemetry data will be used to determine Fish Passage Efficiency at the powerhouse. Future development of a powerhouse prototype surface collector is dependent on results of the spillway and sluiceway juvenile survival data. For purposes of this Work Plan, prototype surface collector design efforts are assumed to resume in FY2000.

2. Description of Activities:

Planned future activities include:

- Field tests of prototype partially blocked turbine intakes, to determine if such a structure would enhance guidance of juveniles into a surface collector or existing ice and trash sluiceway.
- Fish behavioral studies (using hydroacoustics, radio telemetry, and pit tags)
- Model testing, design, construction and testing of prototype surface collectors

3. Schedule of Activities and Costs:

[illegible]

It is noted that surface bypass major prototype testing would not occur until at least 2003, assuming full effort for design of the prototype would resume in FY2000. Construction of the 2003 prototype would begin in FY2002, however.

Other Information:

- a. Biological Opinion Measure - This measure is included in the BIOP under RPA18: COE to investigate surface collection at The Dalles dam.
- b. ESA Effects - All installation of prototype equipment will be completed in accordance with appropriate in-water work dates.
- c. Points of Contact:

Norm Tolonen - Project Manager	(503) 808-4708
John Ferguson - Biological Analysis	(503) 808-4775
Marvin Shuttles - Biological Analysis	(503) 808-4762
Jeff Sedey - Engineering Technical Manager	(503) 808-4937
Brad Bird - Hydraulic Analysis	(503) 808-4896

**The Dalles Spillway Survival Study
Work Plan
(FY99 Emphasis)**

1. Purpose/Objective:

The purpose of the juvenile spillway survival study is to determine the effect of high spill volumes on juvenile fish which pass through the spillway. The current primary method of passing juvenile fish at The Dalles is by utilizing the spillway and spilling at a rate of 64% of total river flow, with the assumption that 80% FPE will be obtained at that spill rate. Survival tests of balloon tagged fish in 1996 and expanded survival tests using pit tagged fish in 1997 and 1998 indicate a higher mortality rate for juveniles passing over the spillway at the 64% rate than was previously assumed. Survival data at a 30% spill rate indicates the numbers of fish spilled may not be significantly impacted by a reduced volume of spill. Juvenile survival rates were also higher at the 30% spill rate than at the 64% rate. The survival rate of juveniles utilizing the sluiceway was also relatively high. Also, a higher percentage of fish passing the powerhouse utilized the sluiceway than was previously assumed. The objective of the study in FY 1999 is to further determine and/or verify the spillway and sluiceway survival at 30% spill rates and determine the impact of day/night and different spill patterns on survival.

2. Description of Activities:

Juvenile fish will be pit tagged and released in test and control groups above and below the spillway and sluiceway. Tagged fish will be monitored as they pass pit tag readers located at the Bonneville First and Second powerhouses to determine the difference in survival between the test and control groups of tagged fish. In 1999, survival testing is proposed at a 30% spill rate for the spillway and sluiceway. Survival tests are currently planned through the year 2000 to replicate the test data and to determine likely causes of juvenile mortality. An analysis to determine the effect of high velocity impact on juveniles is also planned to be conducted in FY99 and FY00.

Associated AFEP studies include MPE-P-97-2 (Spillway and sluiceway survival at The Dalles), MPE-P-96-1 (Hydroacoustic evaluation of fish passage at The Dalles) and SBE-P-95-1 (Radio Telemetry evaluation of fish passage at The Dalles).

3. Schedule of Activities and Costs:

[illegible]

4. Other Information:

This particular item was added to the Fish Mitigation program, starting in FY97

- a. Biological Opinion Measure -. RPA15: The COE shall proceed with studies that will result in improvements in fish passage at mainstem dams... Also, RPA2: The COE shall spill at the Snake and Columbia River projects in order to increase fish passage efficiency and survivals at the dams, with spill rate at The Dalles to be 64% for both Spring and Summer flows (table, p106).
- b. ESA Effects - The research plan and test procedures are coordinated through the AFEP process.
- c. Points of Contact:
- | | |
|---------------------------------------|----------------|
| Norm Tolonen - Project Manager | (503) 808-4708 |
| John Ferguson - Biological Analysis | (503) 808-4775 |
| Marvin Shutters – Biological Analysis | (503) 808-4762 |

**The Dalles Emergency Auxiliary Water Supply System
Work Plan
(FY99 Emphasis)**

1. Purpose/Objective:

The purpose of the measure is to develop and construct a system to provide emergency water supply for adult fish along the powerhouse and south end of the spillway should one of the two existing fish water turbine units fail. The existing fish units are old and are currently required to run simultaneously to provide the required 5000 cfs adult attraction water for the Oregon side fish ladders. New generator windings have been procured for both units and buswork has been modified to separate the units from a shared transformer, however concern remains that there is still a possibility that one of the units could fail during the adult migration. A recent analysis estimated the probability of one of the two generators experiencing a major malfunction (3 to 18 month outage) within the next ten years at approximately six percent.

2. Description of Activities:

Development and analysis of emergency water supply alternatives was completed in FY97, with installation of a pump system being the least costly acceptable alternative. Final selection of an alternative for further development was postponed, however, until completion of a separate study to combine the emergency adult water supply system with relocation of the ice and trash sluiceway outfall. The combined system would utilize a screened dewatering system instead of pumps to provide the auxiliary water to the adult attraction system. The combined system analysis is now complete, with cost estimate for the combined system very near the estimate for the previously recommended auxiliary water supply pump system alone.

Development of design documents is anticipated to commence in FY99, following regional concurrence on the design alternative.

- a. Biological Opinion Measure - This measure is included in the BIOP under ITS16:
The COE shall install emergency auxiliary attraction water system at The Dalles Dam.
- b. ESA Effects - Completion of the study will not impact ESA stocks. Some construction activities during implementation would need to be performed during the in-water work period or at night.
- c. Points of Contact:
- | | |
|---|----------------|
| Norm Tolonen - Project Manager | (503) 808-4708 |
| John Ferguson – Biological Analysis | (503) 808-4775 |
| Brad Bird - Engineering Technical Manager | (503) 808-4896 |

**The Dalles Adult Entrance Channel Dewatering System
Work Plan
(FY99 Emphasis)**

1. Purpose/Objective:

The purpose of this item is to enable easier inspection and maintenance of the lower portions of the adult fishladder entrances and transportation conduit at The Dalles south shore fish ladders. Previous attempts in the mid-1950's to dewater the system were unsuccessful and recent damage to underwater screens at The Dalles emphasize the need for improvements to aid in proper monitoring, operation and maintenance of the system.

2. Description of Activities:

A study initiated in FY1997 to identify and analyze possible alternatives for dewatering the lower portions of the adult fish ladder entrances and transportation conduit for the south shore fish ladders at The Dalles Dam has been completed. The study identifies several alternatives which would enable the adult collection system to be successfully dewatered, with associated cost estimates. Future activities planned include development of a Feature Design Report, based on a selected alternative, and completion of P&S and construction contracts. For purposes of this Plan an alternative which would consist of construction of a concrete wall within the adult collection channel to replace existing stoplogs and procurement of adequate pumps required to dewater the channel is portrayed. Concurrence on the alternative to be developed in more detail in the Feature Design Report will be necessary prior to commencement of the report.

3. Schedule of Activities and Costs:

[illegible]

4. Other Information:

- a. Biological Opinion Measure - This measure is included in the BIOP under RPA7: The COE shall maintain fish facilities within criteria identified in the COE Fish Passage Plan to optimize fish passage to reduce dam passage delays for migrating salmon.
- b. ESA Effects - Completion of the analysis will not impact any ESA stocks.
- c. Points of Contact:
- | | |
|--|----------------|
| Norm Tolonen - Project Manager | (503) 808-4708 |
| John Ferguson – Biological Analysis | (503) 808-4775 |
| Rick Russell - Engineering Technical Mgr | (503) 808-4933 |

Turbine Passage Survival

Work Plan (FY99)

1. Purpose/Objective

The Turbine Passage Survival study will 1) develop operational modifications to improve fish survivability, 2) identify biological design criteria to develop new turbine designs, 3) investigate new or modified turbine designs to improve fish passage, and 4) provide information on turbine passage survival to be used in 1999 system configuration decisions. The study is organized along three integrated tasks: biological testing, engineering testing, and hydraulic modeling. McNary and Bonneville projects will be used to test the two different objectives of 1) optimizing existing equipment and 2) developing new equipment, respectively. See AFEP one-pagers OTS -P-98-1,2 and 3.

a. McNary Operation Improvements - The existing turbines at McNary will be tuned and tested to identify the optimum operation with the lowest levels of fish mortality and damage that could be expected from those machines.

b. Bonneville Minimum Gap Runner (MGR) - The rehabilitation at Bonneville will evaluate the success of new equipment (MGR) in passing juvenile fish through the turbines.

2. Description of Activities

By reducing the FY98 program to just the critical path work items, we can maintain the integrity of the program and continue to make progress on both of the primary goals of the program: 1) tuning the existing machines to improve current operations, and understanding where turbine mortality is occurring so that in the future we can engineer this mortality out of the system, and 2) estimateing the biological benefits associated with the Bonneville minimum gap runner, at a level of understanding and precision that is sufficient enough to allow the incorporation of the MGR concept into future rehabilitation programs, such as The Dalles.

a. McNary - The McNary work on the critical path issues is needed to maintain forward progress on determining where turbine mortality is occurring, and how to design it out. This is the original and main goal of the turbine survival program. Model work will be continued to insure that input into the 1999 Snake River decision will be available, although at a reduced level. Specific work will include modeling of what is perceived to be the best and worst fish pathways through the machine and turbine environment, and a linkage of these conditions back to the general population at large through an evaluation of intake vertical distribution. This will allow for progress in identifying the critical areas within the machine that need to be tested in the biological tests, and then allows us to relate the losses per critical area back to the population at large to determine where we need to focus our redesign efforts in the future. Tuning the existing machines at McNary to optimize blade to gate relationships is also funded in the FY98 program. The knowledge gained through this activity could be applied to other units and

3. Schedule of Major Activities and Costs

4. Other Information

- a. Biological Opinion Measure -** Conservation Recommendation #5 states that the Corps, in coordination with Bonneville Power Administration should develop a program to comprehensively study engineering and biological aspects of juvenile fish passage through turbines, develop biologically based turbine design criteria, and evaluate how well various prototype designs and modifications improve juvenile fish survival through Kaplan turbines. The region has associated a moderate level of importance to this program, in relation to the other fish programs. Funding was initiated in FY97 and continued at a lower level than requested in FY98.
- b. ESA Effects -** Research plans are being developed through the AFEP process. All installation of testing equipment will be completed in accordance with appropriate in-water work dates.
- c. Points of Contact -**
 - John Kranda** - Program Manager (503) 808-4709
 - Chuck Mason** - Project Manager (503) 808-4735
 - John Ferguson** - Technical Manager (503) 808-4775